(No Model.)

A. S. ROSEBERRY.

COMBINED EQUALIZING STOP AND CHECK VALVE.

No. 589,142. Patented Aug. 31, 1897.

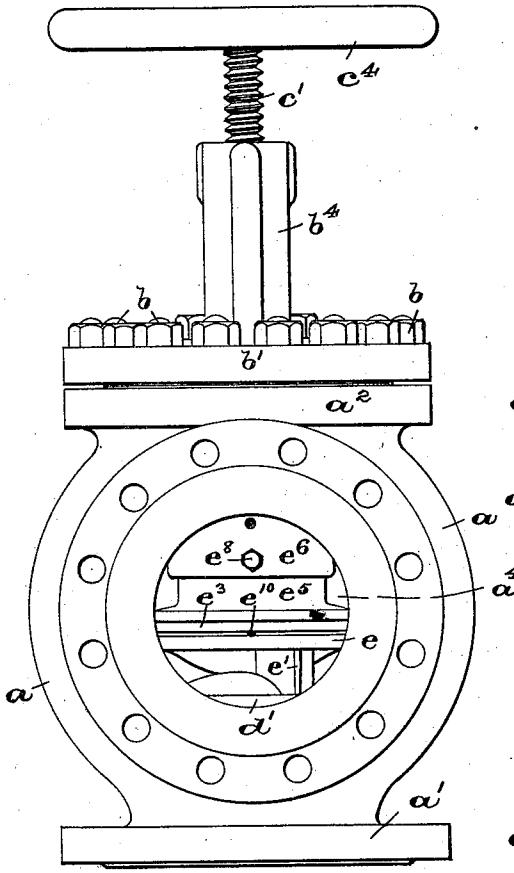

FIG. 1

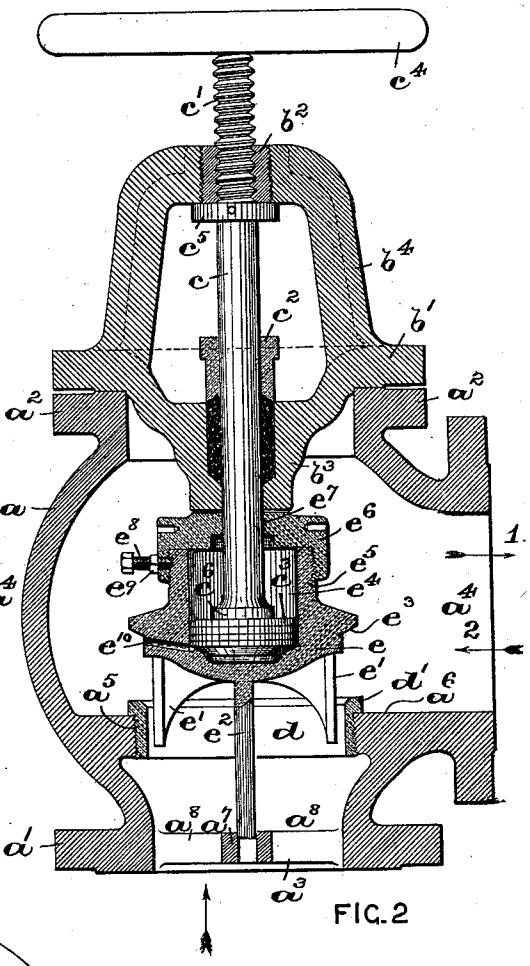

FIG. 2

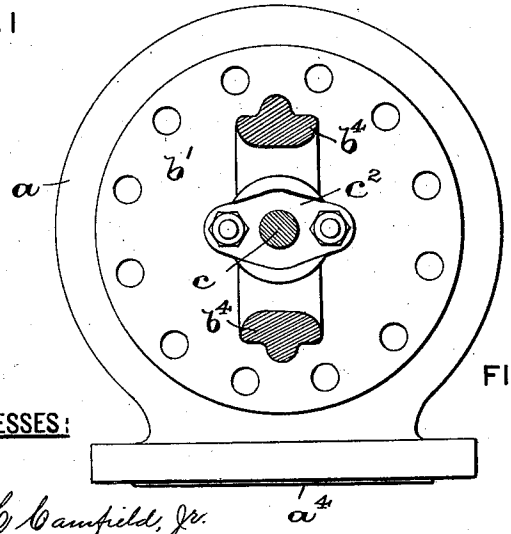

FIG. 3

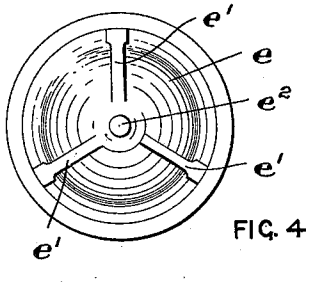

FIG. 4

WITNESSES:

Wm. H. Canfield, Jr.

H. M. Marsh

INVENTOR:

ABRAHAM S. ROSEBERRY.

BY

Fred'k C. Fraentzel,

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ABRAHAM S. ROSEBERRY, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO THOMAS REESE, JR., OF NEWARK, NEW JERSEY.

COMBINED EQUALIZING STOP AND CHECK VALVE.

SPECIFICATION forming part of Letters Patent No. 589,142, dated August 31, 1897.

Application filed February 14, 1895. Serial No. 538,329. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM S. ROSEBERRY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in a Combined Equalizing Stop and Check Valve; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention has for its primary object to provide a combined stop and check valve which is to be used in the lines of piping connecting a series of boilers, said valve construction being such that it is automatically closed when the steam in one boiler is below the pressure of the steam in the other boiler or boilers, but said valve being automatically opened as soon as the pressure of steam below the valve is greater than that above the valve, thereby permitting the equalization of the steam-pressure after the valve has been opened and maintaining an equal pressure of steam in the connected boilers.

A further object of my invention is to provide a valve which will act in this manner to produce a novel form of valve construction which is very simple and effective in its operation and strong and durable and positive in its results.

The invention therefore consists in the general construction of valve herein set forth, and also in certain novel arrangements and combinations of parts, such as will be hereinafter fully described, and finally embodied in the clauses of the claim.

With these ends in view the invention is illustrated in the accompanying drawings, wherein like letters of reference indicate similar parts in the several views, and in which—

Figure 1 is a front elevation of the valve; and Fig. 2 is a vertical section of the same, taken at a right angle in a plane through the vertical axis of Fig. 1, said Fig. 2 illustrating the arrangement and construction of the valve mechanism in its casing. Fig. 3 is a plan view of the valve with the valve-stem represented in horizontal section, and Fig. 4 is an inverted plan of the valve-disk.

In said drawings, a represents the valve-casing, provided with the usual form of flanges a' and a^2 and the inlet a^3 and exit a^4. Secured upon the said annular flange a^2 of the valve-casing a by means of bolts b is a suitable cap b', provided with a supporting-yoke b^4, having an opening in the top thereof, into which is screwed a suitable bushing b^2 and through which works the screw-threaded portion c' of the valve-stem c. Said valve-stem c is adapted to move up and down in a stuffing-box c^2 and also through an opening in the lower portion of the supporting-yoke b^3 in the inner part of said cap b', as will be clearly seen from Fig. 2. Within said casing a and directly above the inlet a^3 is a screw-threaded opening a^5, into which is fitted a valve-seat d in such a manner that the annular flange or shoulder d' thereof rests directly upon the surface a^6 surrounding said opening a^5 in the valve-casing, substantially as illustrated in said Fig. 2. The valve-disk e is provided on its under side with downwardly-extending guides e', which normally project into the opening in the valve-seat d, and also with a stem e^2, which fits loosely in a perforated boss a^7, secured in the inlet of the valve-casing a by means of suitable arms a^8, substantially as shown. Said valve-disk is provided above its seat e^3 with a chambered portion e^4, into which is fitted a piston e^3, operatively connected with the bottom of the valve-stem c. Upon the surrounding portion e^5 of the said chamber e^4, which is preferably screw-threaded, as shown, is secured a suitable head or cap e^6, provided with a central opening e^7, through which the valve-stem c may reciprocate, said cap e^6 being loosely fitted upon said stem c to permit the escape of any steam contained in the chamber e^4 above the piston e^3 through said opening e^7 when the valve-disk e is forced down upon its valve-seat d. To guard against said head or cap e^6 becoming loose on the screw-threaded portion e^5 of the chamber e^4, I may use a suitable set-screw e^8, provided with a lock-nut e^9, whereby these parts can be firmly secured in their fas-

tened positions, as will be clearly understood. The said valve-disk e is also provided with a duct e^{10}, which extends into said chamber e^4 for admitting steam beneath the said piston e^3 to help accelerate the downward movement of the valve-disk e on its valve-stem c when the pressure of steam is greater at the opening a^4 than at the opening a^3 in the valve-casing a. The valve is arranged in the steam-pipe in the usual manner, and the steam is admitted at a^3 in the direction of the arrow shown in said Fig. 2 and passes out through the opening a^4 in the direction of the arrow 1.

Now suppose the steam-pressure in the boiler connected with the inlet a^3 of the valve-casing falls below the required pressure. Then the steam from a second boiler connected with the piping which is in communication with the opening a^4 will naturally flow into the valve-casing a through the opening a^4 therein in the direction of the arrow 2. The steam-pressure in this boiler being greater than that in the boiler connected with the opening a^3 of the valve-casing the result will be that the steam from the inlet a^4 will act upon the surrounding surfaces of the valve-disk e, and, entering the duct e^{10} in the cylinder connected with the valve-disk e, moves the same on the piston e^3, whereby said valve-disk is firmly closed down on its seat d and there can be no loss of steam from the one boiler into the other. During this downward movement of the valve-disk e the steam quickly enters the duct e^{10} to accelerate the closing action of the valve-disk, and any steam that may be in the chamber e^4 above the piston e^3 will be forced out through the opening e^7 in the disk e^6, the steam being sufficiently compressed just before the valve-disk closes down upon the seat d to act as a cushion above the piston e^3 until all the steam is finally, but more slowly, driven from the space above the piston, which allows the valve-disk to close down upon the seat d without hammering. As soon as the steam in the boiler connected with the opening a^3 of the valve-casing a is of a pressure slightly greater than that in the boiler connected with the opening a^4 then the steam-pressure, acting on the lower surface of said valve-disk e, will force the same open, driving the steam from the chamber e^4, now beneath the piston e^3, through the duct e^{10} into the chambered portion of the casing a, and the pressure of steam in the several boilers connected together will become equalized, as will be clearly evident. The said valve-stem c may be provided at the top with a hand-wheel c^4 for forcing the piston down against the inner portion of the valve-disk e and closing the latter on the valve-seat when required. The said valve-stem c has secured thereon a collar c^5, which comes in contact with the under part of the said yoke b^4, and thereby limits the upward movement of the said stem when unscrewed and prevents its shoulder c^6 from jamming up against the inner surface of the head or cap e^6. The piston e^3, connected with the end of said valve-stem c, is preferably provided with packing-rings of any well-known form of construction, arranged to cause a frictional contact between said piston and the inner surface of the cylinder on said valve-disk e, which causes said parts to move with sufficient slowness over the surface of the piston e^3 and to prevent any undue wear and destruction of the parts due to a too sudden contact when a greater steam-pressure is applied to either side of the valve.

It will thus be seen that I have devised a combined stop and check valve which will operate to check and stop the flow of steam into the valve from one boiler into another when the steam-pressure in the two boilers varies and which will operate to equalize the pressure in the two boilers when the valve-disk is automatically opened. In this manner when this form of valve is arranged in a pipe connecting two boilers my invention provides a simple and reliable means for utilizing the pressure in the pipe from one boiler to close the valve when the pressure in a second boiler is lower than that in the other boiler by arranging on the valve-stem a movable valve-disk which is actuated by the steam-pressure from either of the openings a^4 or a^3 in the valve-casing to cause the closing or opening of the said valve, as will be clearly evident. Furthermore, the valve-disk may be closed by hand by screwing down the stem c, as will be noticed from the constructions herein shown, and when the valve-stem is unscrewed the steam coming from the opening a^3 will force the valve-disk upwardly, and thereby open the valve, as clearly indicated in Fig. 2.

From the above description of valve it will be seen that in case of an accident to one of a series of boilers, such as a serious leak or the bursting of one or more tubes or other parts of the boiler giving way, the valve automatically closes and the only loss will be the volume of steam in said damaged boiler, and by thus automatically closing the connection with the other boilers the steam contained in said boiler is saved and can be used without interruption. Furthermore, there will be less escaping steam, which enables the workman to get into the boiler-room much sooner in order to make the necessary repairs.

Having thus described my invention, what I claim is—

1. In a valve, in combination, with the valve-casing, a valve-stem having a piston-head thereon and packing-rings on said piston-head, and a valve-disk provided with a chamber, as e^4, movably arranged on said piston-head, and a duct e^{10} leading into said chamber, substantially as and for the purposes set forth.

2. In a valve, in combination, with the valve-casing, a screw-threaded valve-stem having a piston-head thereon and packing-rings on said piston-head, and a valve-disk provided with a chamber, as e^4, movably arranged on

said piston-head, and a duct e^{10} leading into said chamber, substantially as and for the purposes set forth.

3. In a valve, the combination, of a valve-casing a having openings a^3 and a^4 and a cap provided with a stuffing-box, a valve-stem having a piston-head thereon, and packing-rings on said piston-head, a valve-disk e provided with a chamber, as e^4, and a stem e^2 on the under side of said valve-disk adapted to move in a guide in said opening a^3 in the valve-casing a, substantially as and for the purpose set forth.

4. The herein-described stop and check valve comprising therein, in combination, with the casing a and the valve-stem thereof having a piston-head, of a valve-disk e provided with a chamber, as e^4, movably arranged on said piston-head, said cylinder consisting essentially, of an annular screw-threaded portion e^5 formed on said disk e and a perforated cylinder-head e^8 connected therewith, a duct e^{10} leading into said chamber, substantially as and for the purpose set forth.

5. The herein-described stop and check valve comprising therein, in combination with the casing a and the valve-stem thereof having a piston-head, of a valve-disk e provided with a chamber, as e^4, movably arranged on said piston-head, said cylinder consisting essentially of an annular screw-threaded portion e^5 formed on said disk e, and a perforated cylinder-head e^6 connected therewith, a duct e^{10} leading into said chamber, and guides connected with bottom of said valve-disk, substantially as and for the purpose set forth.

6. In a combined stop and check valve in combination, a casing a having an inlet a^3 and an exit a^4, a valve-seat d, a cap b', provided with a stuffing-box and a valve-stem c movably arranged in said stuffing-box and provided with a piston-head on its lower end, a valve-disk e provided with a chamber, as e^4, movably arranged on said piston-head, and guides on the under side of said valve-disk, all substantially as and for the purpose set forth.

7. In a combined stop and check valve, in combination, a casing a having an inlet a^3 and an exit a^4, a valve-seat d, a cap b', provided with a stuffing-box and a valve-stem c movably arranged in said stuffing-box having a piston-head on its lower end, a valve-disk e provided with a chamber, as e^4, movably arranged on said piston-head, and guides on the under side of said valve-disk, said steam-cylinder comprising therein a screw-threaded annular portion e^5 formed on the upper side of said valve-disk, and a perforated cylinder-head e^6 secured thereon, all substantially as and for the purposes set forth.

8. In a combined stop and check valve, in combination, a casing a having an inlet a^3 and an exit a^4, a valve-seat d, a cap b', provided with a stuffing-box and a yoke b^4 on said cap having a bushing b^2, a screw-threaded valve-stem working in said bushing and in said stuffing-box, said valve-stem having a piston-head on its lower end, having packing-rings on said piston-head, a valve-disk e provided with a chamber, as e^4, movably arranged on said piston-head, and guides on the under side of said valve-disk, all arranged, substantially as and for the purpose set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 23d day of January, 1895.

A. S. ROSEBERRY.

Witnesses:
C. F. MALSBURY,
FRANK B. FINNEY.